Title: Graphing Healthy Habits

Brief Overview:

Students have already learned some basic graphing skills in second grade. They will be reintroduced to the pictograph, which shows the relationships between objects, using symbols. This unit will compare data using the circle graph and the bar graph, and develop graphs that record good health habits.

NCTM Content Standard/National Science Education Standard:

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
- Select and use appropriate statistical methods to analyze data
- Develop and evaluate inferences and predictions that are based on data

Grade/Level:

Grades Three and Four

Duration/Length:

3-4 days (60 minutes per day)

Student Outcomes:

Students will:

- Determine and identify the components of each graph
- Interpret and create simple circle and bar graphs
- Select the appropriate graph related to a specific life experience
- Use graphs to organize relevant information regarding health practices
- Identify, create and use circle and bar graphs
- Practice developing line plots for data analysis

Materials and Resources:

- Markers, crayons
- Assorted graph, chart and construction paper
- Sentence Strips
- Tape
- Rubric
- String or yarn
- Health journals
- Hula hoops and jump ropes
- Gym Instructor

- Healthy and unhealthy snacks
- Two different sizes of boxes of raisins
- Notebook paper

Development/Procedures:

Lesson 1

Pre-assessment

- As the lesson begins with the idea of comparing information in easy and fun ways, two pictographs are displayed on charts. (Ice cream flavor preferences (vanilla, chocolate, strawberry, other), and favorite pets (dogs, cats, birds, fish, other). See Teacher Resources 1 & 2. Students are at the board, in a semi-circle. Have students interpret and analyze the data on the pictographs. (*Which ice cream is the favorite*?)
- Students will conduct a class survey concerning their favorite pets. Informally record student preferences on a large tally sheet. See Student Resource 1. Students will complete the tally chart as you model on the large tally chart.
- Students will use the information to construct a pictograph on Student Resource 2. Have students interpret and analyze the data displayed.
- Display key vocabulary words naming the components of the pictographs on sentence strips. (Title, axis, symbols, key). (Examples for questions: Which pet was selected the most often? What pet was the least favorite?)

Launch

- Begin a discussion regarding one of their favorite foods, pizza. Ask students to brainstorm some of their favorite toppings. List four major toppings on chart paper. See Student Resource 3 (pepperoni, ham, cheese, and green peppers).
- Conduct a survey of the four major choices by tallying the results on the chart paper. Students will be given a piece of construction paper that corresponds with their choices. (Pepperoni-red, ham-pink, cheese-yellow, and green peppers-green.)
- Instruct students to stand with other students who have the same color construction paper. Direct all of the students to stay next to the students with the same color and form a large circle, holding hands. Ask, "Does anyone know the type of graph we've just made?" (*Circle or pie chart*)
- The teacher will then locate and mark the center of the circle, and divide the circle into parts by colors, using string or yarn.
- Students should now be able to analyze and interpret the parts of the HUMAN PIZZA circle graph.

Teacher Facilitation

Gather data regarding activities a student engages in on a typical school day, and record data on the chalkboard. (Waking up and morning routine, arriving at school, school hours, after school activities, evening routine, sleep, recreation- if any, etc;) Discuss and number the activities, starting with the one that involves the most amount of time. (Introduce the vocabulary term-mode.)

Student Application

The students will tell the time they spend on each daily activity listed on the chart. See Student Resource 4. On a large sheet of paper, students will work as a group to create their own circle graph that reflects a typical 24-hour school day. The circle will be divided into 24 equal parts, representing each hour, See Student Resource 5. They will be reminded to include a title and label each activity within the circle. Students will share their final work and make comparisons on an overhead projector on the last day of the unit.

Embedded Assessment

Make a rubric for grading the circle graph with the students. Students will then check their circle graphs using the rubric. Teacher will evaluate student work. See Student Resource 6.

Reteaching/Extension

- More teacher-assisted practice will be given to any students who may need additional help or understanding.
- Write a detailed paragraph explaining the data on the circle graph to share with the class.

Lesson 2

Pre-assessment

- Begin the lesson by brainstorming ideas about the meaning of being healthy. Students should be able to express what good health involves (eating right, exercise, water, some sunlight, fresh air, rest, temperance, dealing with stress, etc; any reasonable answers).
- Hand each student a HEALTH JOURNAL, which they will use for several weeks, recording their choices of food, exercise and hours of sleep. Students can decorate the covers.
- Tell the students that circle and bar graphs will be used today when they exercise with their guest, Ms. _____, the gym instructor.

Launch

- Set out several hula-hoops, and introduce new vocabulary terms- X-axis, Y-axis, intervals. Have each student begin keeping data in their health journals, beginning with a page on exercise.
- Dividing the class into two teams, the PE teacher hands the first student on Team A a hula hoop. A student is assigned to time each attempt to keep the hula-hoop from touching the ground, and another student will record the seconds the timer calls out. Each student has a maximum of 60 seconds to perform.
- After Team A completes their tries, the recorder places their total number of seconds on the board. Team B repeats the same procedure. (Two hula-hoops could be used and Team A and Team B data can be collected concurrently if class size is large.)
- After obtaining all results on the board, the two teams would receive a data sheet and work together to create a bar graph displaying the results in seconds. See Student Resource 7.

Teacher Facilitation

- Magazines and charts are available for students to view and analyze.
- Ask the students to compare the bar graph data with circle graph data (bars rather than one circle, an X axis with intervals). Students will see various intervals and understand that when making bar graphs, a reasonable interval may need to be chosen.

Student Application

- Assisted again by the PE teacher, have students break up into three teams for a rope jumping challenge, which again will be included in their health journals. The same procedures for the hula-hoop challenge would be used.
- After obtaining all results on the board, the three teams would receive a data sheet and work together to create a bar graph displaying the three results in seconds. See Student Resource 8.

Embedded Assessment

After each group has completed their work, all graphs can then be displayed on the board or the wall, and compared for clarity and accuracy.

Reteaching/Extension

- Review what is needed for those who may not completely understand the skills.
- Have those who understand the lesson gather data and create a bar graph chart of favorite fruit, salty and sweet snacks. (Students will need to conduct a survey of the class members prior to beginning the activity. See Student Resource 9.

Lesson 3

Pre-assessment

Display a simple line plot on the board. Students are asked to tell the number of hours of sleep they usually get on a school night. Students can make a line plot (hours of sleep) at their desks. Assist if needed. Have students interpret and analyze the data. Identify gaps, clusters, outliers, median, mode, and range of the data.

Launch

- Discuss healthy and unhealthy snacks.
- Display several healthy and unhealthy snacks. (Examples: raisins, candy, fruit, sunflower seeds, crackers, and donuts.)
- Distribute the larger boxes of raisins to pairs of students.
- Instruct students to count the number of raisins in each box.
- Use the data to create a class line plot.
- Review the components of a line plot. Interpret and analyze the data.

Teacher Facilitation

Ask the students to identify the gaps, clusters, outliers, median, mode, and range of the data. These are the new vocabulary terms.

Student Application

- Distribute smaller boxes of raisins to the students.
- Ask the students to count the number of raisins in their boxes and record the data on sheet of chart paper.
- Have students display the class data on a line plot. Interpret and analyze the data noting the gaps, outliers, clusters, median, mode, and range of the data.

Embedded Assessment

Have students write a paragraph explaining the two different line plots and data by analyzing the gaps, clusters, mode, median, and range of the two line plots.

Reteaching/Extension

A variety of activities will continue to be charted and recorded in the students' health journals for several weeks. The students would note any changes at the end of the unit, and the unit would culminate with students creating a pictograph, circle and bar graph charts to share with their peers. (An example would be for a student to graph their improvement in exercising more often. than they did when they began).

Summative Assessment:

Students will be given an assessment test. See Student Resource Sheet 10. They must be able to select the appropriate graph for specific data, and complete simple tables, using stated facts. See Teacher Resource 3 for an answer key.

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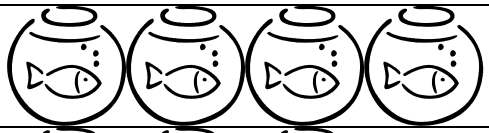
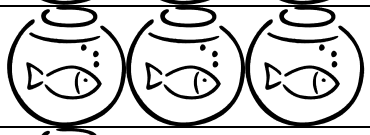
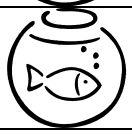
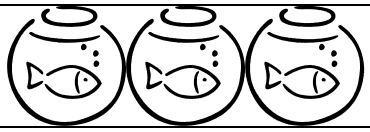
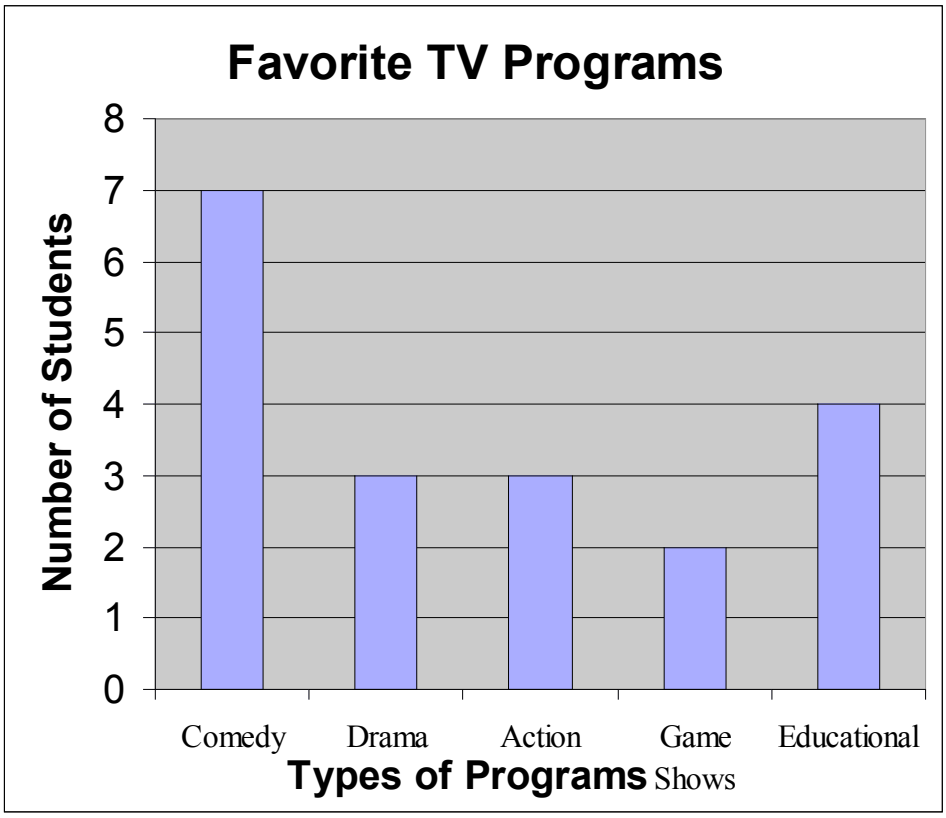
Flavor Favorites	
Ice Cream Flavor	**Number of Students Preferring this Flavor**
Vanilla	
Strawberry	
Chocolate	
Other	

 Equal 2 students

Pet Preferences	
Pet	**Number of Students Preferring this Animal**
Dog	
Cat	
Bird	
Fish	
Other	

 Equal 2 students

Data Analysis Assessment Test



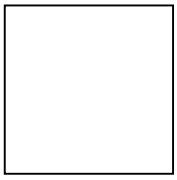
Questions:

1. How many students chose Educational programs? (*4*)
2. How many more students chose Comedy compared to Game shows? (*5*)
3. What was the least popular TV program? (*Game shows*)
4. What is shown on the X-axis? (*Types of Programs*)
5. What does the Y-axis tell you? (*The number of choices made for each program.)*
6. Did any programs have the same number of votes? (*Drama and Action*)
7. What types of programs were not on the graph? (*Any reasonable Answer*)
8. Why do you think comedy programs were the students' favorite? (*Any reasonable answer)*

Pet Preferences	
Pet	**Students Preferring this Animal (Tally)**
Dog	
Cat	
Bird	
Fish	
Other	

Student Resource 2 – Pet Pictograph Template

Pet Preferences	
Pet	**Number of Students Preferring this Animal**
Dog	
Cat	
Bird	
Fish	
Other	

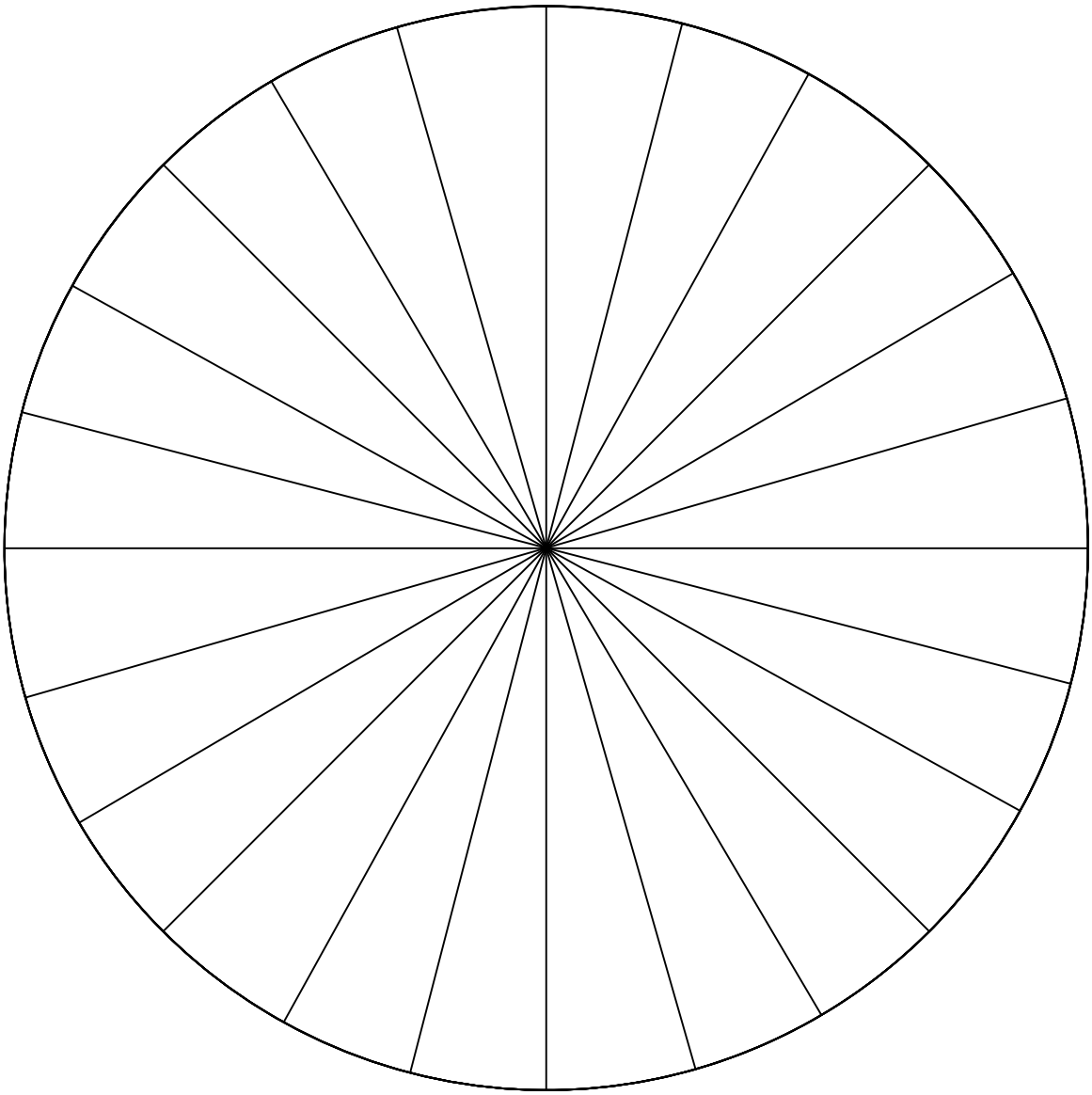


Equals 2 students

Top Pizza Toppings	
Topping	Students Preferring this Topping (Tally)
Pepperoni	
Ham	
Cheese	
Green Peppers	

Typical Day	
Activity	Number of Hours Spent on… (Tally)
Sleep	
School	
Entertainment	
Chores and Meals	
Homework	

Typical School Day



Key:

Sleep	**Red**	
School	**Pink**	
Entertainment	**Yellow**	
Chores and Meals	**Green**	
Homework	**Blue**	

Scoring Rubric for Circle Graph

Score Point 3

- Correct number of categories
- Categories are correctly labeled
- Graph is appropriately titled
- Color is used in a meaningful way on the graph

Score Point 2

- Correct number of categories
- Categories are labeled
- Graph is labeled
- Circle graph uses color but not in a meaningful way.

Score Point 1

- One or more labels may be missing
- Categories are attempted, but the number may be incorrect
- Title may be missing or incorrect

Score Point 0

- No labels at all.
- Not attempted
- Circle graph does not use color

Hula-Hoop Challenge	
Team	Elapsed Time (Group Total)
One	
Two	

Jump Rope Challenge	
Team	Number of Jumps (Group Total)
One	
Two	
Three	

Student Resource 8 – Bar Graph Template

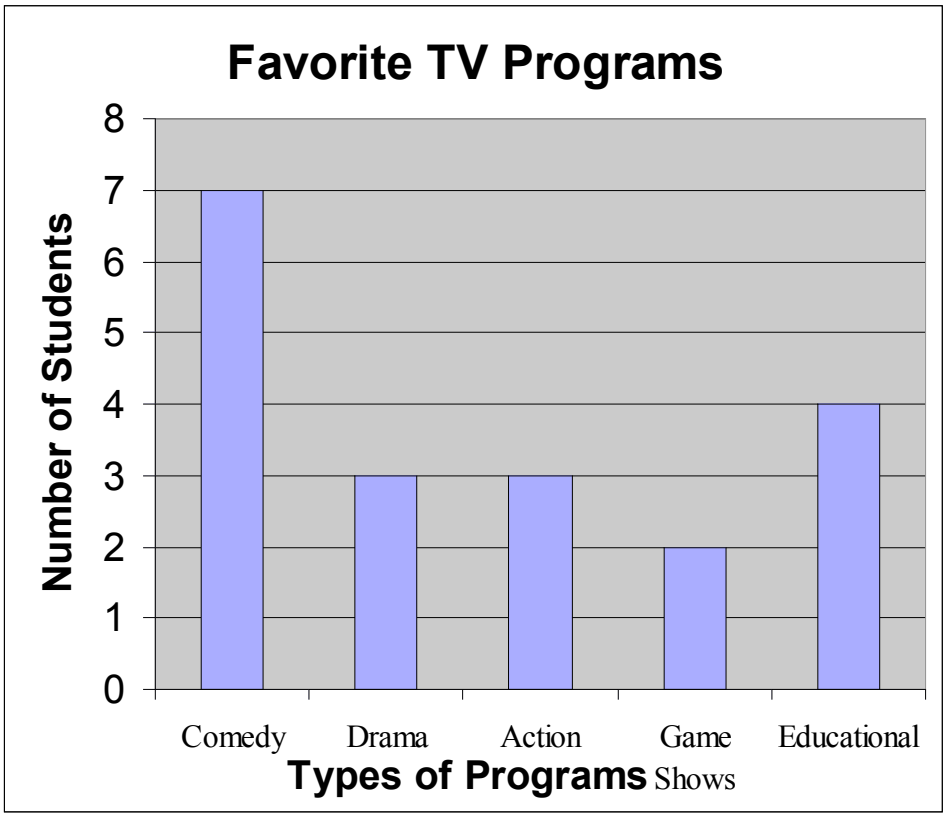
_____

_____ _____ _____

_____

Favorite Snacks	
Snack	Students Preferring this Snack (Tally)
Fruit	
Salty	
Sweet	

Data Analysis Assessment Test



Questions:

1. How many students chose Educational programs?
2. How many more students preferred Comedy to Game shows?
3. What was the least popular TV program?
4. What is shown on the X-axis?
5. What does the Y-axis tell you?
6. Did any programs have the same number of votes?
7. What types of programs were not on the graph?
8. Why do you think comedy programs were the students' favorite?